# Structural investigation of binary aqueous Na-silicates

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**Résumé**

Structural properties of binary aqueous Na-silicates (used industrially for paints, glues and fire-proof products), both at room and high temperature, have been investigated to better understand the phenomenon of foaming and its link to the densification of the network. A comparison with glasses prepared by the industrial melt and quench process has also been made. 29Si Liquid and solid-state NMR spectroscopy has been utilized for the quantification of structural units defined as Qn. Solid-state NMR, in particular, has also allowed for the identification of the environment of Na and proton-related species. Heating a liquid Na-silicate leads to structural changes due to the evolution of water content present in the system as free water, solvating water and silanols. Foaming is observed at temperatures above 150∘C resulting in the densification/polymerization of the network. Changing the amount of Na in the system tends to have an effect on the corresponding structural properties and foaming. This structural investigation has allowed us to have a better understanding of the macroscopic expansion as well as microscopic behavior of alkali silicates for addressing the issues being faced in the industrial sector.

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